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IUCN GUIDELINES FOR REINTRODUCTIONS AND CONSERVATION TRANSLOCATIONS OF SPECIES – PROBLEMS AND SOLUTIONS

DIANA ZLATANOVA

Department of Zoology and anthropology, Faculty of Biology, Sofia University "St. Kliment Ohridski"
**Corresponding author: zlite2@gmail.com*

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Abstract: The current impact of the human civilization on the Earth's biodiversity leads to a rapid population decline and even extinction of many species. Due to this, conservation organizations and institutions undertake efforts for reintroductions of locally extinct species or other conservation translocations. Many of these efforts are without feasibility studies, nor proper assessment of the local situation or a local consent which often is a costly failure. This leads to the clear necessity of setting up rules and identifying potential pitfalls when initiating a reintroduction or other conservation translocation attempt. Such issues are addressed in the IUCN's Guidelines for reintroductions and other conservation translocations developed by the Task Force of the Reintroduction and Invasive Species Specialist Groups (2010 – 2012). The IUCN's view on the definitions and classification of translocations, the needs and objectives, the feasibility studies and planning phase, the design of the translocations, the release and implementation stage, the monitoring and continuing management and the risk assessment on every step of the translocations are presented with a discussion of pitfalls and critical examples of existing translocation projects.

INTRODUCTION

The current impact of the human civilization on the Earth's biodiversity leads to a rapid population decline and even extinction of many species. Due to this, conservation organizations and institutions undertake efforts to recover the locally extinct species by means of reintroduction or other conservation translocations. Many of these efforts are without feasibility studies, nor proper assessment of the local situation or a local consent which often leads to a costly failure. This calls for a clear necessity of setting up rules and identifying potential pitfalls when initiating a conservation translocation attempt. Such issues are addressed in the IUCN's Guidelines for reintroductions and other conservation translocations (IUCN/SSC, 2013) developed by the Task Force of the Reintroduction and Invasive Species Specialist Groups (2010 – 2012). Down below the IUCN's view on the definitions and classification of translocations, the needs and objectives, the feasibility studies and planning phase, the design of the translocations, the release and implementation stage, the monitoring and continuing management and the risk assessment on every step of the translocations are presented with a discussion of pitfalls and critical examples of existing translocation projects.

History and evolution of definitions

Evolution of RSG Guidelines

The increasing interest in releasing animals in different areas on the Earth led to the IUCN Position Statement on the Translocation of Living Organisms developed in 1987. This was the first attempt to set up some rules for translocations continued by forming a group of specialists known as IUCN Reintroduction Specialist Group. Later on, the IUCN Guidelines for Reintroduction were finalized in 1995 and officially printed in 1998. These guidelines were revised and transformed in 2013 into Guidelines for Re-introduction and other Conservation Translocations (Version 1).

The definitions introduced with these documents are as follows:

- The IUCN Position Statement on the Translocation of Living Organisms (1987):Translocation, Re-introductions & Introductions.
- The IUCN Guidelines for Re-introduction (1995):Re-introductions, Reinforcements & Conservation Introductions.
- The Guidelines for Re-introduction and other Conservation Translocations (2013)Introduced new terminology due to effects of climate change and restoring ecosystem function- Assisted Colonization and Ecological Replacement.

Current definitions

To identify the goals of the recovery of a species first we need to clear up definitions. Very often the word ***reintroduction*** is wrongly used to describe *efforts for reinforcement of the population or even introduction of new species*. Per se, all these recovery actions are conservation translocations.

Translocation *is the human-mediated movement of living organisms from one area, with release in another.* Translocations may move living organisms from the wild or from captive origins. Translocations can be accidental (e.g. stowaways) or intentional. Intentional translocations can address a variety of motivations, including for reducing population size, for welfare, political, commercial or recreational interests, or for conservation objectives. ***Conservation translocation*** on the other hand is the intentional movement and release of a living organism where the primary objective *is a* ***conservation benefit***. This will usually comprise improving the conservation status of the focal species locally or globally, and/or restoring natural ecosystem functions or processes. Conservation translocation scan entail releases either within or outside the species' *indigenous range* (Fig. 1). **The indigenous range of a species** is the known or inferred distribution generated from historical (written or verbal) records, or physical evidence of the species' occurrence. Where direct evidence is inadequate to confirm previous occupancy, the existence of suitable habitat within ecologically appropriate proximity to proven range may be taken as adequate evidence of previous occupation.

The conservation translocations are divided into two groups: Population restoration and Conservation introduction. Any other translocations with no clear conservation goals should not be treated as conservation translocations.

Population restoration is any conservation translocation within indigenous range and may be expressed with two activities: **Reinforcement** and **Reintroduction.** ***Conservation introductions*** (the intentional movement and release of an organism outside its indigenous range) may be executed via **Assisted**

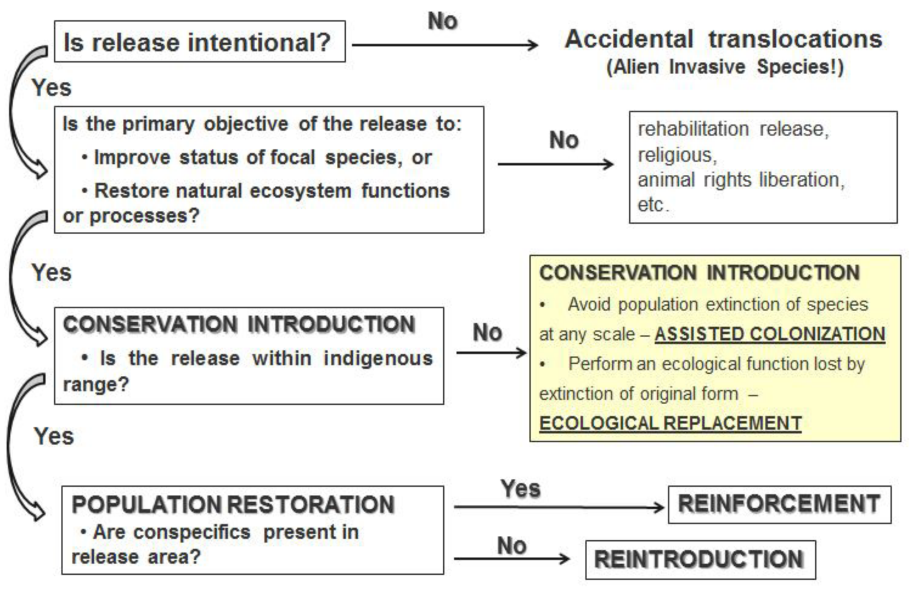

Fig.1 The translocation spectrum according to intentions, objectives and presence of individuals of the species in the release area

Accidental translocations are unintentional releases of animals, which often create catastrophic situation of allowing alien invasive species to severely affect native populations. Islands are the most vulnerable to Accidental translocations – some of the most prominent cases are the grey squirrel (*Sciurus carolinensis*) in Great Britain, rats and cats in Antigua leading almost to total extermination of the Antiguan racer (*Alsophis antiguae*), even the domestic dogs resulting in dingoes in Australia. In many European countries keeping and breeding as pets of the North American red-eared slider (*Trachemys scripta elegans)* led to unintentional local release when people are getting rid of unwanted pets into ponds and rivers around their houses. Because of the high adaptability of this species (allowing it to quickly settle in different places) the red-eared slider is included in the list of the world's 100 most invasive species, published by the IUCN (Lowe et al., 2000).

There are several known cases when animals are intentionally release because of animal rights actions, for religious and other purposes, such as releases of wild animals after treatment for injures and rehabilitation procedures. These intentional releases are not considered Population Restoration actions by the Guidelines.

There are several justifications for conservation introductions of species outside their native range. Usually such actions are not recommended being too the risky. Global evidence shows that introductions of species outside the range can cause extreme negative impacts (long term effect on native populations, risk of creating invasive species, disease transmitting, etc). If a high degree of uncertainty remains then a project should be re-evaluated and alternative conservation options should be sought.

Yet, conservation introductions (via Assisted colonisation or Ecological replacement) might be a last option for saving some species from total extinction. Here are some examples:

- Via ***Assisted colonisation*** (intentional movement and release of an organism outside its indigenous range to avoid the total extinction of populations of the focal species)-translocating of kakapo (or night parrot) *Strigops habroptila* (Gray, 1845) on predator-free offshore islands in New Zealand might save the species from extinction The kakapo is large, flightless, nocturnal, ground-dwelling parrot, endemic to New Zealand and predators pose a significant threat for its survival.

Another example with a different reason for assisted colonisation is the Torreya pine (*Torreya taxifolia*), commonly known as the Florida torreya or gopher wood. This is a rare and endangered tree found in the South-eastern United States, at the state border region of northern Florida. There are 1000 trees left with no recruitment for more than 20 years due to climatic changes. Moving the species to cooler climate in Georgia where it never existed before supports the reproduction of this species.

- Via ***Ecological replacement*** (intentional movement and release of an organism outside its indigenous range to perform a specific ecological function) - a project for introduction of two tortoise species (*Aldabrachelys gigantea* from Seychelles and *Astrochelys radiata* from Madagascar) into Mauritius Island group (Rodriges and Round islands). The primary goal of this project is the replacement of the role of the extinct in 1800s megaherbivore tortoise *Cylindraspis sp.* and to restore its lost ecological functions (Fig. 2).

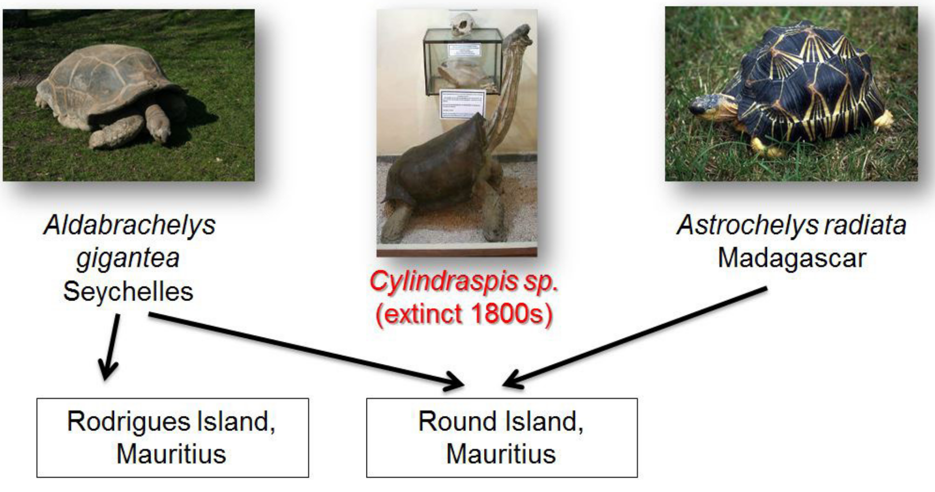

Fig.2 Example of Ecological replacement

The Population Restoration action called ***Reinforcement*** (synonyms: Augmentation; Supplementation; Re-stocking; Enhancement for plants only) is the addition of individuals to an existing population of conspecifics (Fig. 3) to enhance the numbers, to correct skewed sex ratios, improve genetic status, etc. This type of action is **always risky** to the existing wild population, introducing factors such as diseases or genetic pollution by the introduced individuals, which may be of the wrong race and/or subspecies, etc.

There are many examples of such reinforcement projects in Europe and in Bulgaria in particular – for Griffon vultures (*Gyps fulvus*) (Peshev et. al., 2015), European souslik (*Spermophilus citellus*), chamois (*Rupicapra rupicapra*), etc.

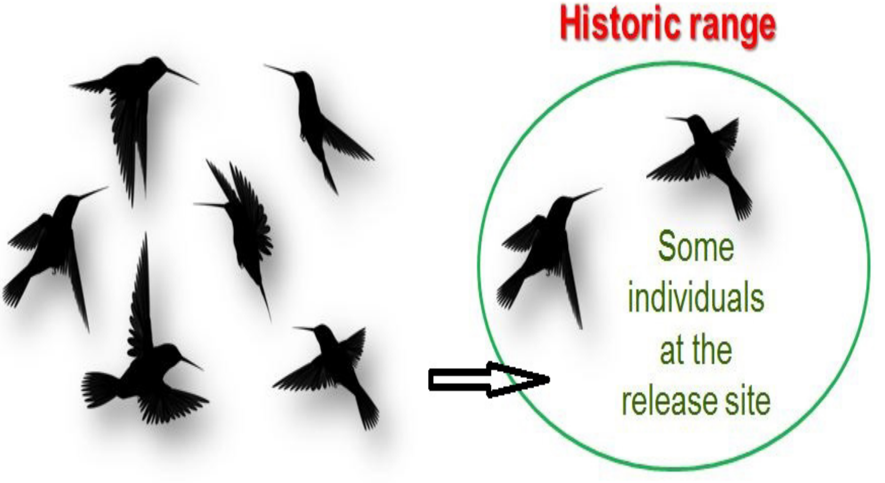

Fig.3 Population Restoration: Reinforcement

The Re-introduction as a Population Restoration is an attempt to establish a species in an area which was once part of its historical range but from which it has been extirpated or become extinct (Fig. 4). For example, the recovery of the Arabian oryx(*Oryx leucoryx*) in the Arabian Peninsula, the Pere-David's deer (*Elaphurus davidianus*) in China, Black-footed ferret (*Mustela nigripes*) in the Canada, United States and Mexico, Lammergeier (*Gypaetus barbatus*) in the Alps and others are success stories for population restoration through reintroduction.

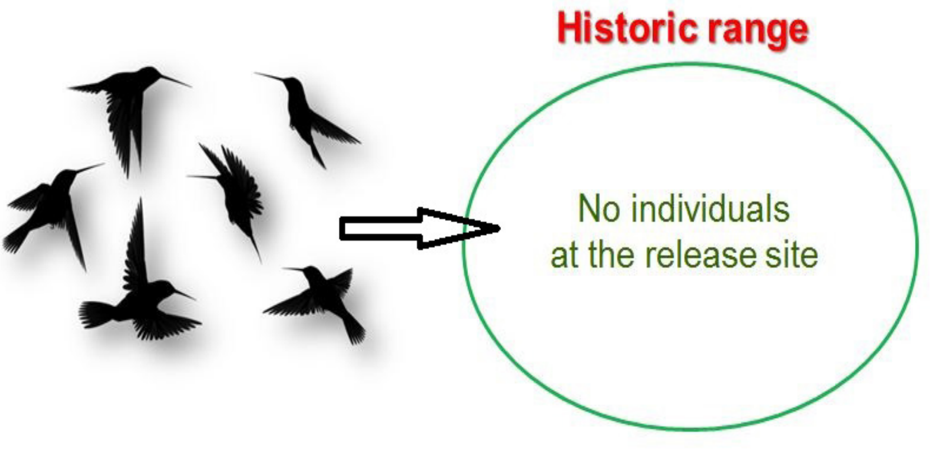

Fig.4 Population Restoration: Re-introduction

Reinforcement or Reintroduction?

There is a room to debate when a project for local translocations such as some of the mentioned species for Bulgaria (Griffon vultures, European souslik, chamois), is a reinforcement or local reintroduction project. The animals are translocated in areas from where they had really extinct, but there is still a population of these species left in the country or the whole population is still intact although in smaller numbers. In most of the cases (in species with intact connectivity in the population such as the griffon vultures) the restoration attempts are in fact reinforcement not reintroduction if they are related to countries and not geographically.

Deciding when translocation is an acceptable option

- There should generally be strong evidence that the threat(s) that caused any previous extinction have been correctly identified and removed or sufficiently reduced. Most of the translocation projects start without a feasibility study and account of the present threats which results in a failure of the species to settle down.
- Assessment of any translocation proposal should include identification of potential benefits and potential negative impacts, covering ecological, social and economic aspects. In any decision on whether to translocate or not, the absolute level of risk must be balanced against the scale of expected benefits.
- Risk analysis around a translocation should be proportional to the presumed risks.
- Justifying a conservation introduction requires an especially high level of confidence over the organisms' performance after release, including over the long-term, with reassurance on its acceptability from the perspective of the release area's ecology, and the social and economic interests of its human communities.

Steps for successful recovery programs based on translocations

Detailed description and discussions on each step's issues of the translocations are provided in the monograph of Ewenet. at. (2012).

Step 1.Planning a translocation

- Clearly defined Goals, Objectives & Actions should be set, discussed and re-evaluate if needed. The translocation project should start with Why (Goals), How (Objectives) and How in details (Actions)– following a logical path without missing a step.
- A clear monitoring program should be designed to follow the progress through all steps.
- Exit strategy should be prepared in advance – in case a project does not go according a "Plan B" should be in place.

Step.2 Feasibility and design of the program

This step comprises 3 important components - Biological feasibility, Social feasibility and Regulatory requirements. Such feasibility studies an example is already done profoundly in Bulgaria by Ragyov et al., 2009.

A. Biological feasibility

- Includes the basic biological knowledge on the species to be translocated. For example if animal species is to be translocated the food preferences, behaviour and sociality, reproduction and dispersal, etc should be well know in advance to predict the performance after release and the success of the project.
- Habitat preferences and based on that - habitat suitability for calculation of caring capacity and selection of appropriate release sites. Very important step to justify the questions Where and How many specimens would be translocated.
- Climatic requirements – there should be an account for the climate change !
- Founders – where to obtain individuals from (source) & availability, from which taxon and taxon substitution (in case of subspecies), genetic considerations of the relatedness of populations or individuals in the founder group
- Animal Welfare – how the animals should be transported, kept before release, capture/tranquilized for capture/release purposes, etc.
- Disease & parasite considerations– there should be a strict control over possible disease spread through translocation: veterinary/phito-sanitary analyses of wild populations before translocation; animals should be kept in quarantine if coming from wild population, etc.

B. Social feasibility

- Any recovery should be linked to legal and policy frameworks, biodiversity action plans or species recovery plans. Non coordinated attempts may have severe consequences.
- Local community and stakeholders should be involved in any step or otherwise their neglect will lead to a failure. The public support prior any release is crucial !
- Evaluate both positive and negative impacts of a translocation to local communities to predict performance of the local community towards the release species.
- Multiple parties involved in most translocations have their own agendas - make sure these are aligned through effective leadership.
- A translocation should not harm other ecosystems, species or human interests, especially in conservation introductions

C. Regulatory requirements

- International movement of species should be conducted according CITES (Washington Convention).
- Legislation of releasing species outside their indigenous range should prevent release of alien invasive species.
- Licenses from relevant authorities to release species should be acquired in advance.
- Cross-border movements should be done according to international, tribal, etc systems.
- Regulatory compliance – veterinary and phyto-sanitary requirements should be met before release.
- Resource availability – funding, specimens for release and all needed equipment should be provided in advance !

Step 3.Release and implementation phase

- Selection of appropriate release site and areas – these sites should be carefully chosen according to the biological (habitat preferences) and social feasibility studies.
- Release strategy – the release should be done according to species dispersion age/season preferences. Age/size/sex composition should be planned in advance, as well as the composition of specimens in multiple releases over time.
- Minimize the stress in animals during capture, transport and pre-release.

Step 4 Monitoring & Information management

Monitoring

- A feedback approach is important lesson learnt. It should lead to better project design and implementation.
- Behavioural monitoring of released individuals can be an early indicator of translocation progress, including ecological monitoring impact on the environment.
- Genetic monitoring where genetic issues (such inbreeding) are critical to the success of a translocation. Most of the translocation projects seriously neglect this step.
- Health and mortality monitoring issues of disease and welfare conditions on a released population.
- Social, cultural and economic monitoring to engage local communities in monitoring exercises can also be used to assess attitudes towards the translocation.

Question to answer before setting a monitoring a translocation progress:

1. What evidence will measure progress towards meeting translocation objectives and, ultimately, success or failure?
2. What data should be collected, where and when, to provide this evidence, and what methods and protocols should be used?
3. Who will collect the data, analyse it and ensure safe keeping?
4. Who will be responsible for disseminating the monitoring information to relevant parties?

Step 5 Dissemination of information – regular reporting in both scientific and grey literature

This step is very important both for supporting the social and funding aspects of the release. Regular reports, leaflets, posters and brochures are integral part of the translocation projects for disseminating the outcome of these projects both in a scientific and popular language.

The conservation translocation cycle

Each conservation translocation should follow the following cycle (Fig. 5) to secure a success.

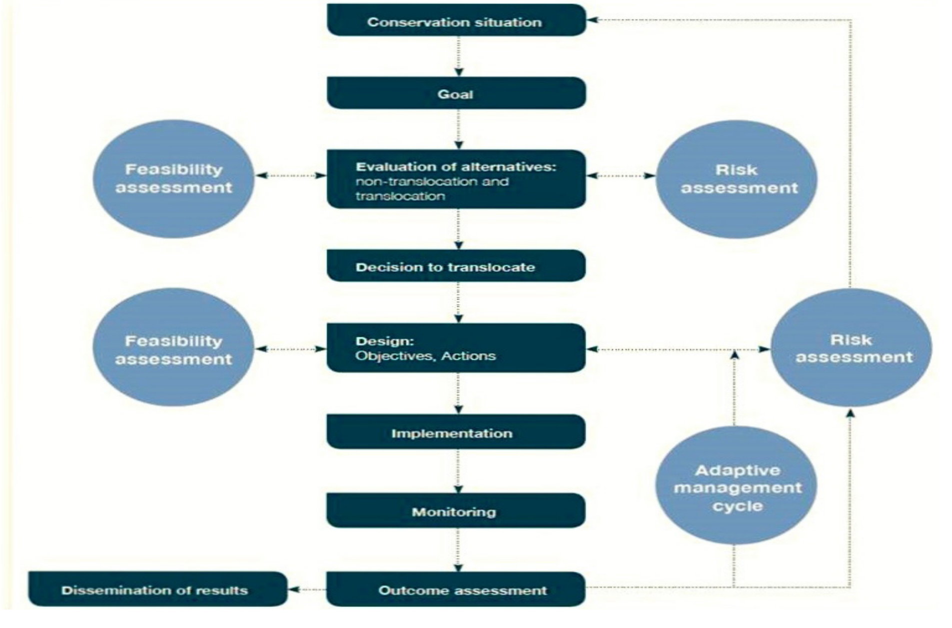

Fig. 5 The conservation translocation steps and cycle

Successful translocation (reintroduction and reinforcement) programs in Europe

Successful and ongoing programs in Europe

- Alpine ibex (*Capra ibex*) in the French, Italian and Swiss Alps (successful)
- Eurasian brown bear (*Ursus arctos arctos*) in the Alps (ongoing)
- Eurasian beaver (*Castor fiber*) in several places in Europe (successful)
- European otter (*Lutra lutra*) in the Netherlands (ongoing)
- Eurasian lynx (*Lynx lynx*) in Switzerland (successful), and other parts of Europe (ongoing)
- European souslik (*Spermophilus citellus*) in Bulgaria (ongoing)
- European black vulture (*Aegypius monachus*) in the Massif Central in France
- Griffon vulture (*Gyps fulvus*) in the Massif Central, France (successful), Central Apennines, Bulgaria, Italy, and Northern and Southern Israel (ongoing)
- Lammergeier(*Gypaetus barbatus*) in the Alps (successful), Switzerland (successful)
- Lesser kestrel (*Falco naumanni*) in Spain (successful), Bulgaria (ongoing)
- Lesser white-fronted goose (*Branta erythropus*) in Sweden and Germany (ongoing)
- Northern bald ibis (*Geronticus eremita*) in Austria and Italy (ongoing)
- Peregrine falcon (*Falco peregrinus*) in Germany, Poland, Sweden and Norway
- Red kite (*Milvus milvus*) in Ireland
- White-tailed eagle (*Haliaeetus albicilla*) in Ireland (ongoing)
- Wisent (*Bison bonasus*) in Poland, Belarus (successful) and other parts of Europe (ongoing)

Successful programs in other places

- South African cheetah (*Acinonyx jubatus*) in Swaziland (successful)
- Arabian oryx (*Oryx leucoryx*) in the Sultanate of Oman (successful), United Arab Emirates (successful), Israel (successful)
- Bornean orangutan (*Pongo pygmaeus*) in East Kalimantan, Indonesia
- North African ostrich (*Struthio camelus*) in Israel and Saudi Arabia (ongoing)
- Nubian ibex (*Capra nubiana*) in Israel (successful)
- Père David's deer (*Elaphurus davidianus*)in China (successful)
- Persian fallow deer (*Dama dama mesopotamica*)in Israel (ongoing)
- Persian onager (*Equus hemionusonager*) in Saudi Arabia (successful)
- Przewalski's horse (*Equus ferus przewalskii*) in Mongolia (ongoing)
- Sudan cheetah (*Acinonyxjubatus*) in United Arab Emirates (ongoing)
- Yarkon Bleak fish (*Acanthobrama telavivensis*) in Israel (successful)
- Black-footed ferret (*Mustela nigripes*) in the Canada, United States and Mexico

- California condor (*Gymnogyps californianus*) in California and Mexico (ongoing)
- Grey wolf (*Canis lupus*) to Yellowstone National Park (successful)
- Musk ox (*Ovibos moschatus*)in Alaska (United States) (successful)

More feedback about current reintroduction case studies are provided by Soorae (2013)

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